The Bio-Derm Ridge Plumping Technique for Pontic Site Development

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Abstract

Background: Seibert Class III apicocoronal and buccolingual alveolar ridge defects with associated gingival mucosal atrophy and absence of interdental papillae are common in edentulous areas within the anterior esthetic zone of the maxilla. Normal emergence profiles, critical to achieving esthetic restorations, require restoration of normal hard and soft tissue morphology, including re-establishment of adjacent interdental papillae.

Methods: In this 30 patient consecutive case series, significant Seibert Class III defects were simultaneously grafted with a slowly resorbing xenograft (Bio-Oss®) and an acellular dermal matrix allograft (Puros Dermis®) in order to effect both functional and esthetic improvements in the anterior maxilla without requiring secondary harvesting procedures. Fixed interim restorations with ovate pontics served as guides for the development of critically important interdental papillae.

Results: In all cases normal crestal hard and soft tissue architecture was restored, including re-establishment of interdental papillae, through simultaneous bone and soft tissue grafting without resorting to secondary autogenous graft harvesting procedures. Definitive non-implant supported fixed restorations with cleansable and esthetic ovate pontics and normal emergence profiles were achieved in each case.

Conclusions: Thirty consecutive patients with significant Seibert Class III alveolar ridge defects were successfully treated with simultaneous bone (Bio-Oss® particulate) and soft tissue grafting (Puros® Dermis Allograft) procedures. By avoiding autogenous hard and soft tissue grafts, the Bio-Derm Ridge Plumping Technique eliminated the need for additional invasive harvesting surgeries while allowing for the completion of both bone and soft tissue augmentation procedures in a single surgical visit.

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KEY WORDS: Mucogingival surgery, bone graft, pontic, prosthetics

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INTRODUCTION

In the esthetic zone of the maxilla a proper emergence profile, predicated on healthy normal marginal gingival tissues with intact interdental papillae, is critical to achieving esthetically pleasing traditional fixed and implant supported restorations. Adequate soft tissue morphology, however, is dependent upon a stable, adequate volume of underlying bone capable of serving as a viable, biologic foundation for overlying soft tissues. Without the harmony afforded by a proper balance of underlying bone and overlying soft tissue, esthetic restorations are not possible, especially in the anterior maxilla. Frequently, however, alveolar bone loss disturbs that critical balance, resulting in marginal tissue distortion, recession and loss of esthetically crucial interdental papillae. Bone loss is common in the esthetic zone and can result from multiple precipitating events, the most common following tooth extraction. Multiple studies have documented predictable 3 mm to 4 mm of buccolingual and apicocoronal ridge resorption within 6 months after removal of maxillary anterior teeth. If left untreated up to 50% buccolingual bone loss will occur after one year post tooth removal in the critical esthetic zone.[1-3]

Buccal marginal bundle bone loss following disruption of intact PDL fibers after tooth removal and prominent, thin buccal bone subject to critical blood supply loss following extraction, are frequent causes of post-extraction bone loss within the maxillary esthetic zone.[3-4] In addition, advanced periodontal disease, trauma, periapical infection and developmental defects commonly lead to bone loss and ridge deformities in areas critical to esthetic restorations. As a consequence of such frequently encountered bone loss, negative soft tissue morphologic changes often occur, including reduction or loss of keratinized marginal gingiva and disappearance of interdental papillae, both essential for esthetic dental reconstruction in the esthetic zone of the maxilla.

Seibert, in an attempt to develop rational therapeutic approaches to alveolar ridge deformities, classified three major types of ridge deformities.[5] Class I is a buccolingual loss of tissue with a normal apicocoronal dimension. Class II is an apicocoronal loss of tissue with normal buccolingual ridge width. Class III is a combination of buccolingual and apicocoronal loss of tissue resulting in loss of both normal height and width and is the most difficult class to successfully treat. Correctly classifying the type of ridge deformity as a guide to effective surgical and restorative treatment will help optimize the final restorative result.

Numerous procedures, including distraction osteogenesis, bone splitting, guided bone regeneration and autogenous onlay bone grafting provide surgeons with a wide range of alternative approaches to managing the bony component of alveolar ridge deformity.[6-11] Autogenous bone grafts have been considered the "gold standard" for bone regenerative procedures.[12-13] Autogenous bone harvesting, however, is both invasive and technically demanding. Moreover, autogenous grafted bone resorption up to 40-50% has been demonstrated when autogenous grafts are used for treating horizontal and vertical alveolar ridge defects.[14]

Distraction osteogenesis, while an alternative approach to vertical ridge augmentation, is technically demanding and often difficult for patients unable to tolerate intra-oral distraction devices.[14-15] While suitable for Seibert Class II defects, distraction osteogenesis cannot treat the horizontal components of Seibert Class I and III alveolar ridge deformities.

Guided bone regeneration (GBR) is used for bony ridge augmentation with or without osseointegrated implant placement.[16-17] GBR, with a barrier membrane in combination with bone grafts or bone graft substitutes, offers predictability in providing bone augmentation simultaneously in both horizontal and vertical directions, and is therefore appropriate for treating all three deformities within Seibert's classification.[18-20] Allografts, alloplasts and xenografts have all been used in GBR procedures to correct alveolar ridge defects prior to restorative treatment.

Although critical to restorative success in the esthetic zone of the maxilla, regeneration of normal bony ridge architecture must also be associated with restoration of normal soft tissue anatomy, including recreation of missing interdental papillae. Insufficient volume of gingival soft tissue as well as poorly configured soft tissue architecture will mandate modifications in the design of fixed or removable prostheses to compensate for the deformity. Often such modifications result in overly large, ridge-lap pontics that fail to promote normal function, esthetics and ready cleansibility.[21] Current surgical methods to correct soft tissue ridge deficiencies rely primarily on autogenous soft tissue grafts or allograft acellular dermal matrices, either alone or in conjunction with bone regenerative procedures.

A variety of autogenous soft tissue graft types are available for correction of ridge deficiencies. Small to moderate Class I defects can be treated with the roll technique, utilizing a deepithelialized palatal connective tissue pedicle flap inserted within a properly prepared buccal pouch.[22] Likewise, subepithelial connective tissue grafts are widely used for correction of primarily Seibert Class I defects, although they can be used to correct mild vertical height deficiencies as well. Connective tissue grafts provide good to excellent color match with adjacent gingival tissues, often resulting in increased amounts of keratinized tissue at the graft site.[23-26] Free gingival full-thickness onlay grafts are used to correct Seibert Class I, II and III ridge deficiencies, but often pose esthetic problems with adjacent tissue.[27]

Although widely used, soft tissue autografts require an additional invasive surgical procedure to harvest the graft material, increasing the potential for increased surgical morbidity. A finite amount of available autogenous tissue also limits the amount of soft tissue grafting that can be done at any one point in time. Furthermore, autograft shrinkage often demands further soft tissue grafting, requiring additional harvesting procedures, each with the potential for increased postoperative pain, hemorrhage, or infection.[25]

In an attempt to avoid some of the problems unique to soft tissue autografts, including the need for a second surgical procedure, clinicians have turned to acellular dermal matrix allografts as an alternative to autogenous soft tissue grafts. Originally developed for the treatment of full-thickness burn wounds, acellular dermal matrix is an allograft obtained from human skin.[28-29] Processed so that the epidermal layer and all dermal cells are removed, the result is a graft matrix with normal type I collagen bundling architecture and an intact basement membrane. Removal of all cells eliminates the possibility of viral survival and transmission as well as the components necessary for graft rejection. Rather than healing by granulation, acellular dermal matrix grafts serve as conductive matrices, allowing cellular migration and neovascularization from the surrounding

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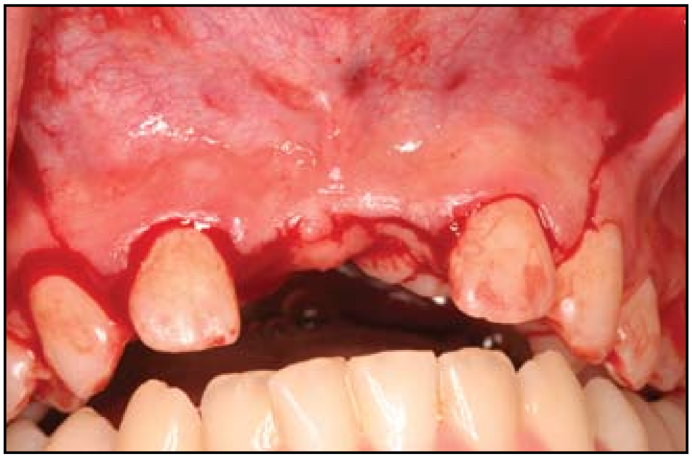

Figure 1: Midline crestal and releasing incisions made prior to flap reflection.

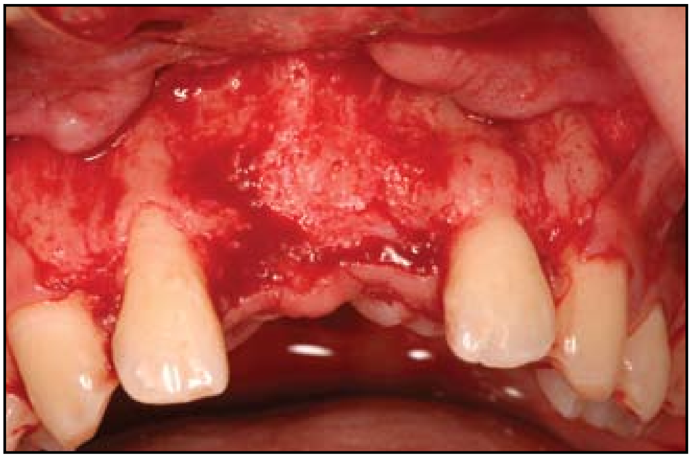

Figure 2: Full-thickness mucoperiosteal flaps allowed complete access to all areas of the Seibert Class III defect.

host bed to repopulate and replace the graft site.

Although originally designed as an alternative treatment for burn wounds, acellular dermal matrices have been used extensively in dentistry as alternatives to autogenous soft tissue grafts. Dental use has included management of gingival recession,[30-37] increasing the zone of keratinized tissue around teeth and implants,[38-40] and preserving and/or increasing gingival thickness in edentulous areas.[41-47]

The purpose of this thirty patient consecutive case series was to investigate the efficacy of simultaneously grafting significant anterior maxillary Seibert Class III alveolar ridge defects with a slowly resorbing xenograft particulate (Bio-Oss®, Osteohealth Company, Shirley, NY) combined with an overlying acellular dermal matrix allograft (Puros® Dermis Allograft, Zimmer Dental Inc.) in order to restore both normal osseous and soft tissue contours, including restoration of interdental papillae, in patients requiring traditional fixed prosthetic restorations.

MATERIALS AND METHODS

Study Population

Thirty consecutive patients with significant apicocoronal and buccolingual alveolar hard and soft tissue ridge deformities (Seibert Class III) were included in this reported case series. The patient population included 12 females and 18 males between 19 to 58 years of age. Detailed past medical and dental histories were obtained for each patient. All patients were treated by the authors as part of their clinical practice.

Clinical Evaluation

Following a detailed clinical examination, panoramic and full-mouth periapical radiographs were obtained for each patient. All patients presented with edentulous areas within the maxillary esthetic zone that had been previously restored with traditional, non-implant supported fixed restorations. Entrance into the study required Seibert Class III deficiencies, including loss of interdental papillae.

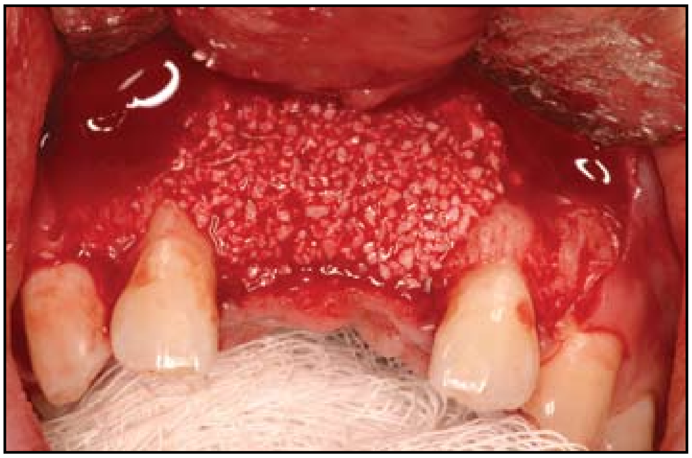

Figure 3: Bio-Oss® particulate graft material was carefully placed over the exposed buccal and palatal cortices as well as the alveolar crest to allow bone regeneration to occur in all areas of the ridge defect.

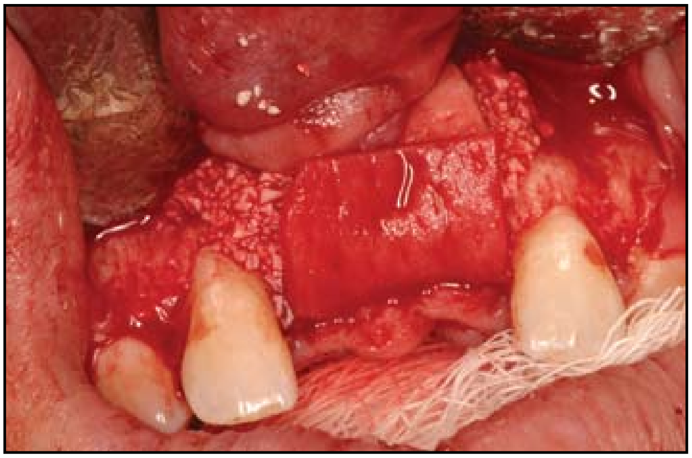

Figure 4: After being trimmed and saturated with sterile saline, Puros® Dermis was positioned over the Bio-Oss® graft in order to act as both a GBR barrier membrane and conductive matrix for gingival soft tissue regeneration.

Overview of the Surgical Procedure

Prior to surgery, all patients received oral hygiene instructions as well as full mouth scaling and curettage. Detailed informed consents were obtained, indicating understanding of the nature of the proposed surgical treatment.

Using a #15 scalpel, midline crestal incisions were made at each edentulous site. Mesial and distal vertical release incisions allowed wide exposure of the maxillary buccal cortex (figure 1). Full-thickness buccal and palatal mucoperiosteal flaps were reflected, exposing the entire extent of the alveolar ridge deformity (figure 2). Following thorough wetting with sterile saline, small particle size Bio-Oss® particulate graft material was carefully placed over the exposed buccal cortex as well as the over the alveolar crest and palatal cortex to allow bone regeneration to occur in all areas of the ridge defect (figure 3). Puros® Dermis Allograft was then trimmed to size, saturated with saline, and placed over the Bio-Oss® graft in order to act as a conductive matrix for gingival soft tissue regeneration to occur simultaneously with underlying new bone formation (figure 4). Importantly, the Puros® Dermis was placed facing the periosteal surface of the mucoperiosteal flap. The soft tissue flaps were then repositioned and closed without tension via multiple interrupted 5.0 ePTFE sutures (figure 5).

A carefully prepared interim fixed restoration with ovate shaped pontics was then placed onto previously prepared abutment teeth (figure 6). In addition to satisfying both functional and esthetic requirements, the interim restoration was used as a guide during soft tissue maturation for creation of a more natural soft tissue profile, including the formation of interdental papillae. Pleasing emergence profiles were thus created by guiding the morphology of the soft tissues with the interim restoration during soft tissue regeneration.

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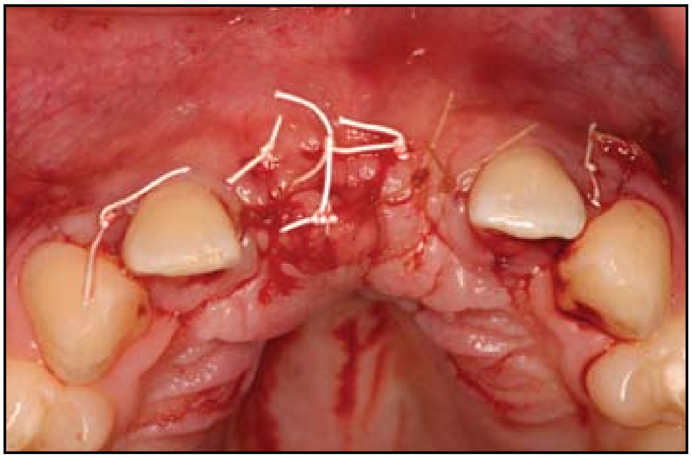


Figure 5: Soft tissue flaps were closed without tension via multiple interrupted 5.0 Gore-Tex sutures.

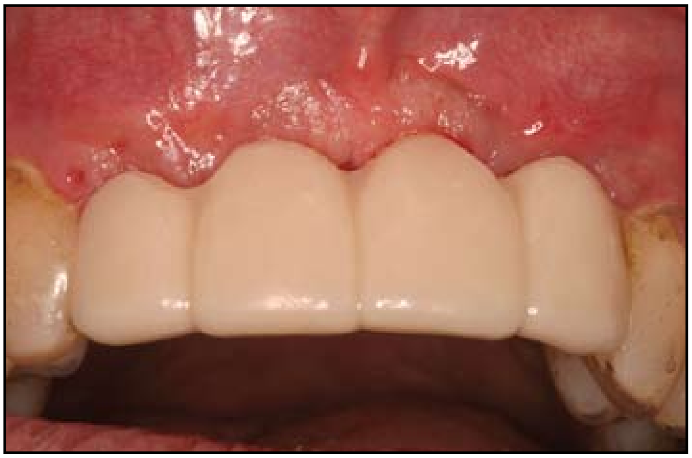


Figure 6: An interim restoration with ovate shaped pontics served as a guide during soft tissue maturation for the development of interdental papillae.

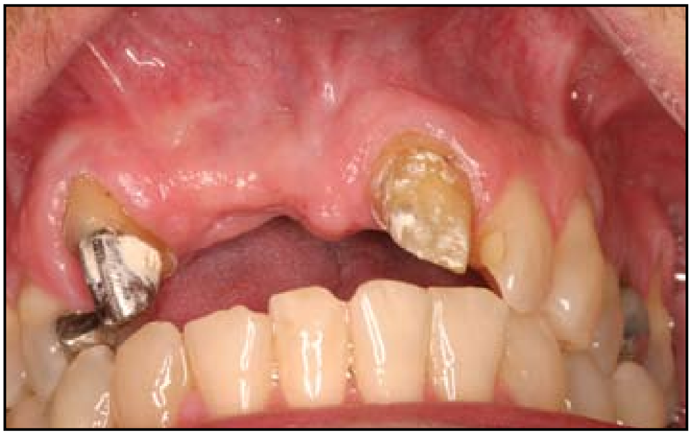


Figure 7: Seibert Class III defect demonstrates significant apicocoronal bone loss.

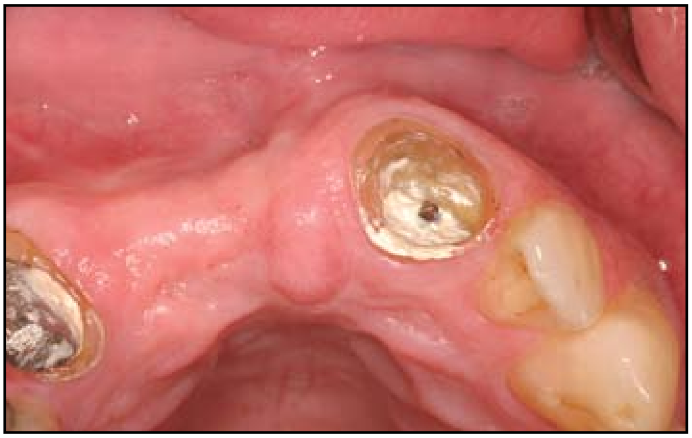


Figure 8: An occlusal view demonstrates severe bucco-palatal narrowing in the esthetic zone of the maxilla.

REVIEW OF REPRESENTATIVE CASES

The following illustrate several representative cases that demonstrate both specific surgical and prosthetic procedures as well as obtained results when correcting difficult to treat hard and soft tissue defects within the esthetic zone of the maxilla with Bio-Oss® particulate graft and Puros® Dermis Allograft.

Case #1

The patient, a 37 year old male presented with a Seibert Class III anterior maxillary edentulous defect of 15 years duration (figures 7, 8). The patient's current prosthodontist constructed a new interim fixed restoration to replace a previously made and now clinically deficient fixed bridge. In order to compensate for significant apicocoronal and buccolingual bone loss as well as for loss of interdental papillae, overly large

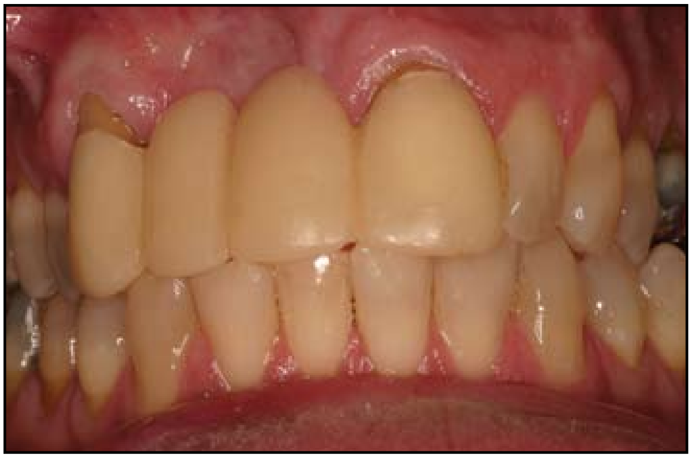


Figure 9: Ridge lap pontics attempt to compensate for ridge deficiency of case 1.

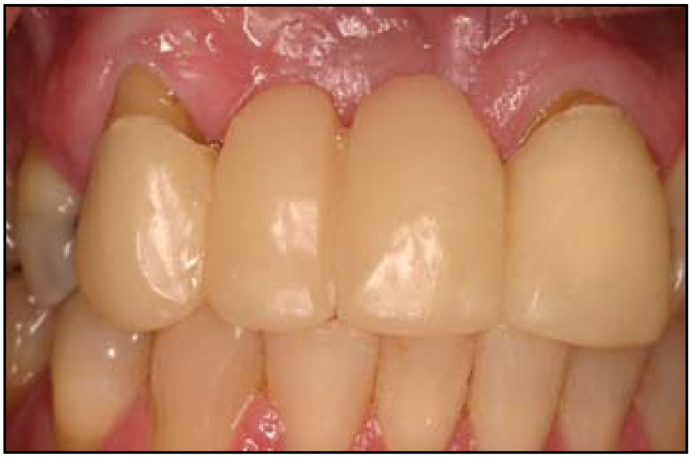
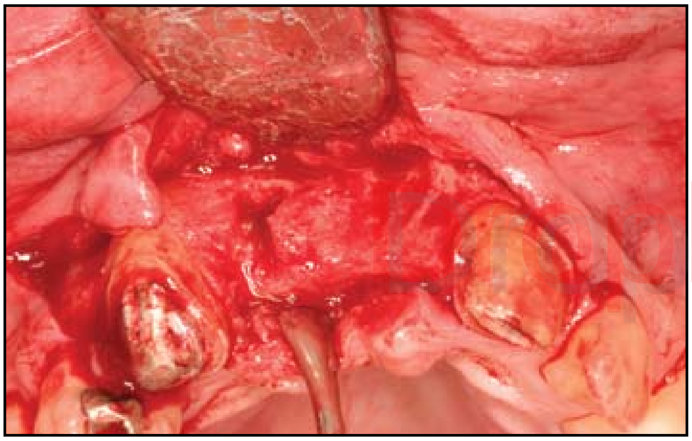


Figure 10: Additional view of ridge lap pontics from case 1.



Figures 11: Flap reflection revealed significant bucco-palatal bone loss as well as the remnants of a residual cyst.

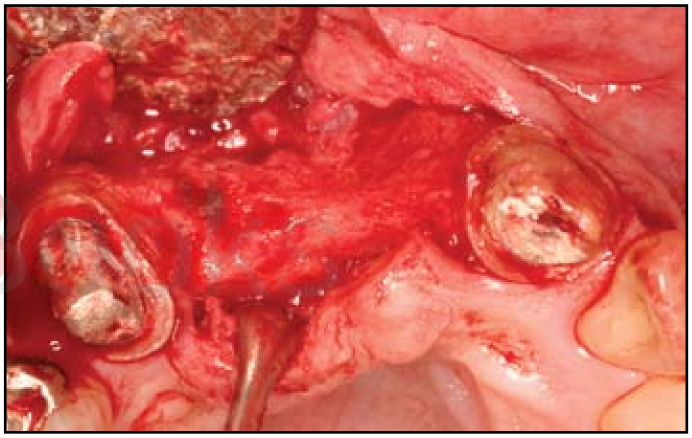


Figure 12: Additional view of defect from case 1.

ridge-lap pontics were placed in the edentulous area (figures 9, 10). At augmentation surgery, well-released full thickness buccal and palatal flaps revealed severe alveolar ridge narrowing as well as a small residual cyst in the right lateral incisor region. When removed, the residual cyst resulted in an additional anatomic defect within the anterior maxillary ridge (figures 11, 12).

In order to restore the anatomic integrity of the bony ridge to its normal dimensions, small par-

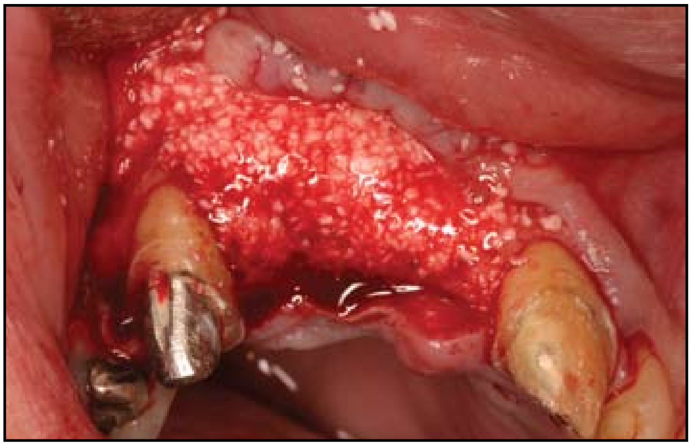


Figure 13: Small particle size Bio-Oss® was carefully grafted to cover all areas of the anterior maxillary defect site.

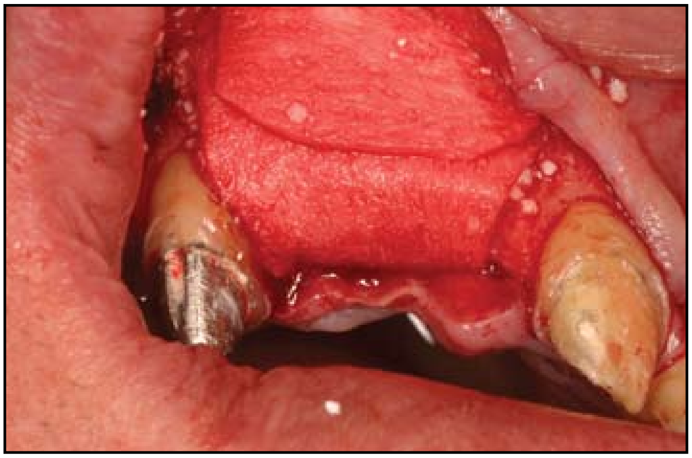


Figure 14: A double layer of Dermis allograft was placed over the Bio-Oss® graft.

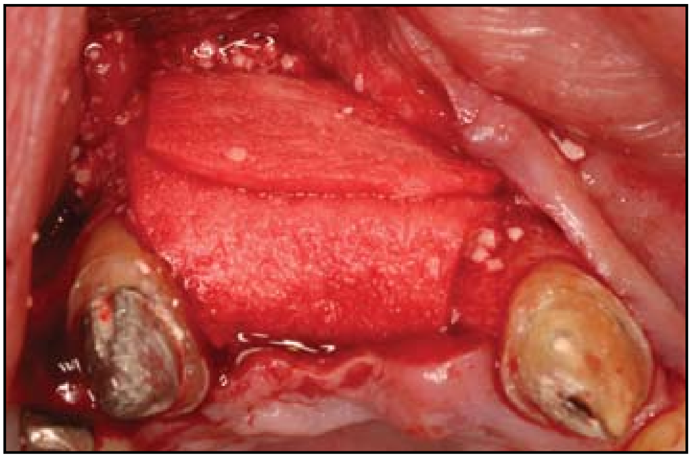


Figure 15: Additional view of layered grafting technique.

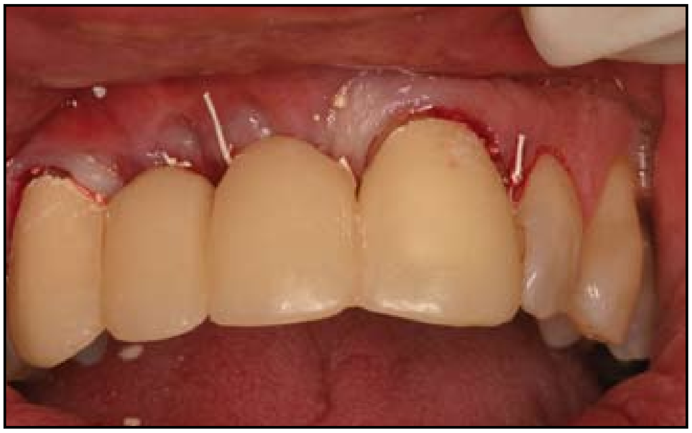


Figure 16: A new fixed interim restoration with ovate shaped pontics, no longer over-sized, was temporarily cemented into place.

ticle size, slowly resorbing Bio-Oss® particulate graft material was carefully placed along both the entire exposed buccal cortex and alveolar ridge crest. Slight over-contouring with Bio-Oss® was required in order to assure restoration of normal apicocoronal and buccolingual dimensions once healing was complete (figure 13). A double layer of Puros® Dermis allograft was then placed over the Bio-Oss® graft, serving as both a Guided Bone Regenerative barrier membrane and as a conductive matrix for overlying soft tissue regeneration (figures 14, 15). The mucoperiosteal flaps were then closed primarily via multiple 5.0 ePTFE sutures. A new fixed interim restoration with ovate shaped pontics, no longer over-sized, was temporarily cemented into place (figure 16). During the ensuing healing period the interim restoration was revised as needed in order to act as a guide during soft tissue maturation for the development of critically important interdental papillae (figures 17, 18).

Case #2

The second case is a 52 year old male with severe maxillary ridge atrophy in the maxillary central incisor area secondary to long standing tooth loss in this region (figure 19). In an attempt to compensate for both apicocoronal and bucco-palatal bone loss, the patient presented with oversized ridge lap pontics of both maxillary central incisors (figures 20-22). In addition to the patient's Seibert's Class III ridge defect, the patient also presented with a deep anterior overbite secondary to supreruption of the mandibular incisors,

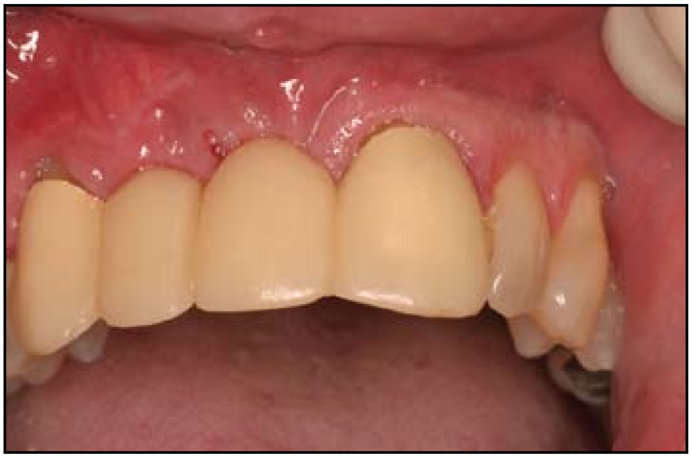


Figure 17: Case 1 interim restoration used for soft tissue guidance.

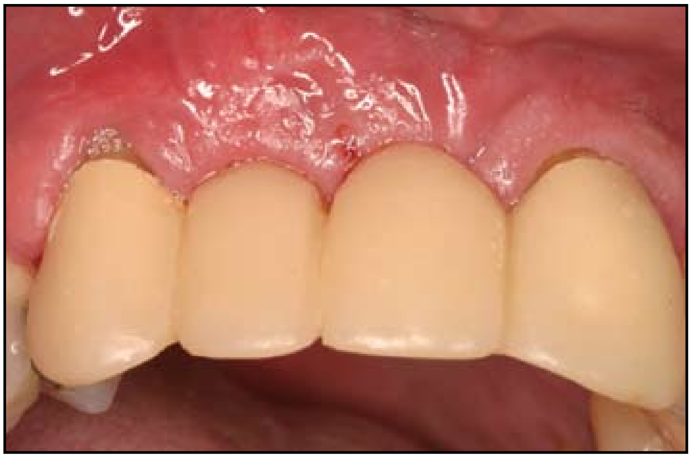


Figure 18: Additional view of interim restoration with ovate pontics guiding soft tissue healing.

loss of interdental papillae within the edentulous space, periodontally compromised maxillary lateral incisor teeth, and multiple stained teeth throughout both arches (figure 21).

Following reflection of full-thickness buccal and palatal mucoperiosteal flaps, both maxillary lateral incisors were removed, exposing large fenestrated and dehiscence bony defects of the buccal cortex, further exaggerating the alveolar ridge deformity (figure 23). As in Case #1, small particle size, Bio-Oss® particulate graft material was carefully placed along both the entire exposed buccal cortex and alveolar ridge crest (figure 24). Puros® Dermis allograft was then placed over the Bio-Oss® graft and the flaps closed primarily with multiple interrupted ePTFE sutures (figures 25, 26). An interim restoration with ovate shaped pontics was temporarily cemented into place (figure 27). Over the next 4 months the interim restoration served as a guide for the formation of esthetically important interdental papillae (figure 28).

In planning for the definitive restorative result, care was taken to address each of the patient's dental problems, including correction of occlusal plane discrepancies with its deep overbite and supraeruption of the mandibular incisors. The cast metallic framework for the final maxillary restoration dramatically illustrates the increase in ridge width as well as creation of interdental papillae obtained by correcting the patient's severe Seibert's Class III defect with simultaneous bone and soft tissue grafting (figure 29). No longer are ridge lap pontics required. Rather proper placement of the fixed

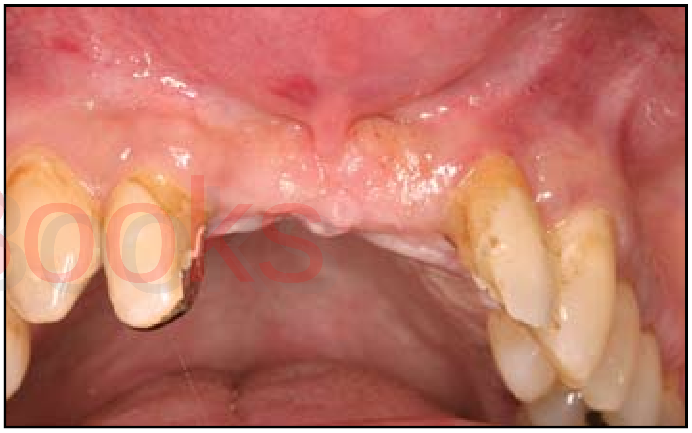


Figure 19: Severe apicocoronal and bucco-palatal maxillary ridge atrophy seen in case 2.

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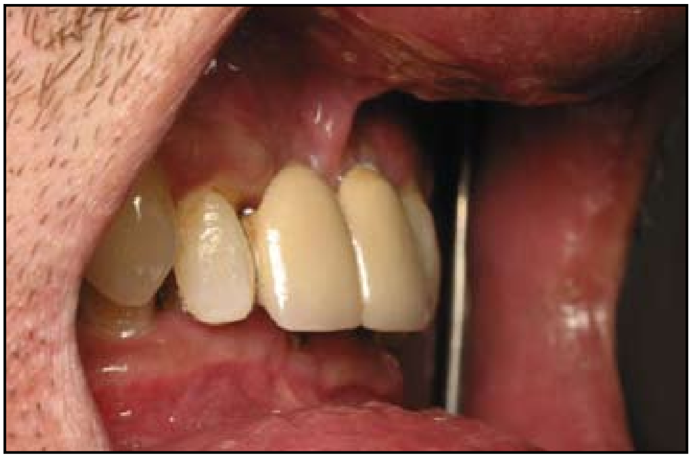

Figure 20: Oversized ridge lap pontics attempt to compensate for ridge deficiency of case 2.

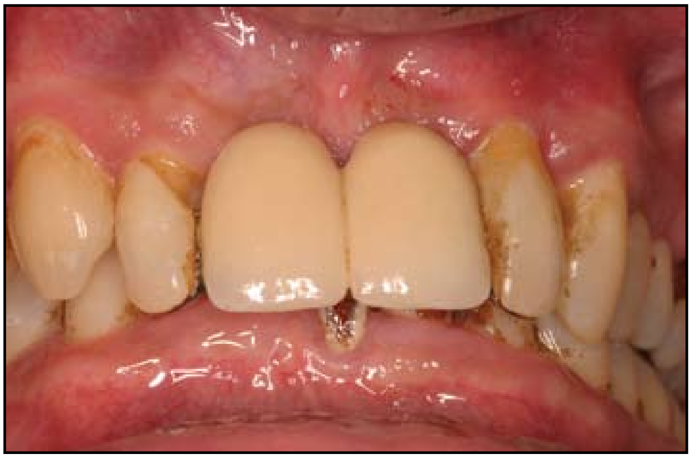

Figure 21: Note deep overbite associated with pre-op restorations of case 2.

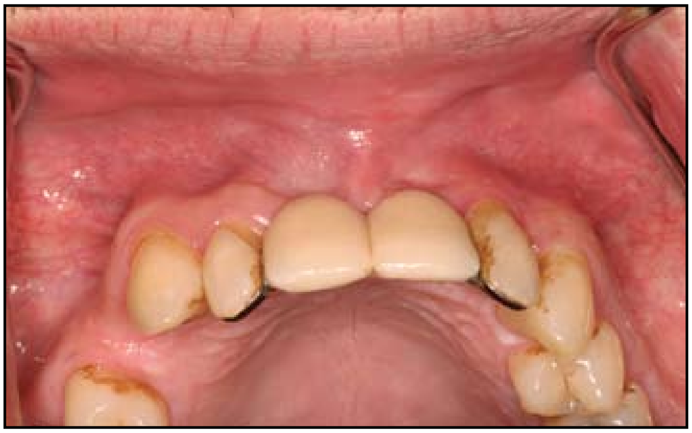

Figure 22: Occlusal view demonstrates severe ridge deficiency of case 2.

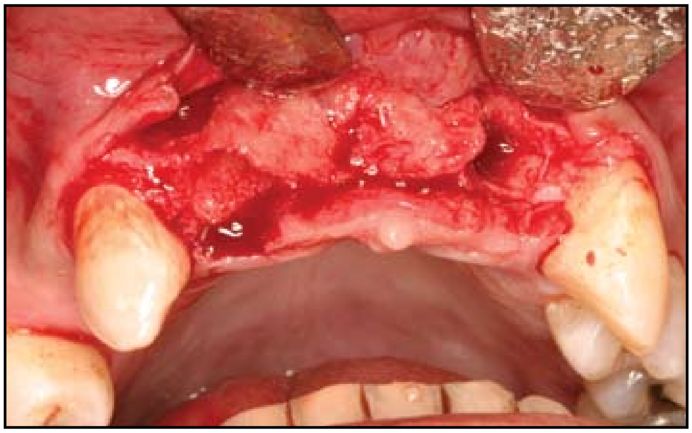

Figure 23: Removal of peridontally compromised lateral incisors exposed significant fenestrated and dehiscence defects of the buccal cortex.

restoration relative to normal anatomic emergence profiles of all four maxillary incisor teeth is now possible, satisfying the stringent esthetic requirements within the esthetic zone of the maxilla. Improvement in both function and esthetics is dramatically evident in the final definitive restorations following correction of the patient's occlusal plane discrepancies (figures 30, 31).

Case #3

Case #3 dramatically illustrates the potential of simultaneous grafting with Bio-Oss® particulate plus Puros® Dermis Allograft in the correction of a severe dental Class III occlusal discrepancy. The patient, a 24 year old male lost both maxillary central incisors secondary to trauma nine years prior to presenting for definitive restorative treatment. Trauma induced bone loss resulted

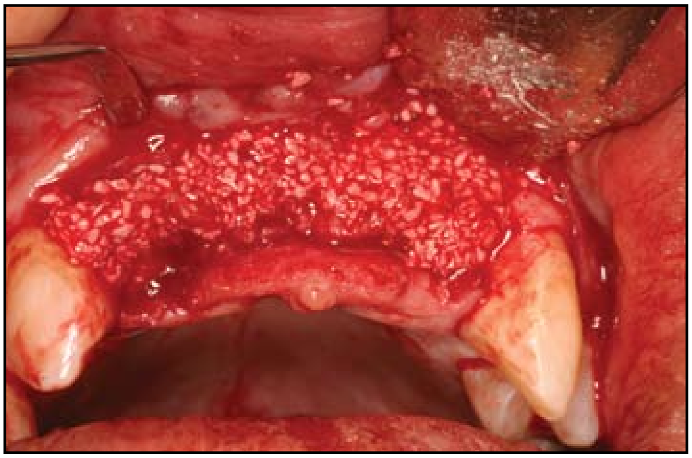

Figure 24: Small particle size Bio-Oss® particulate graft material was placed along the exposed buccal cortex and alveolar ridge crest.

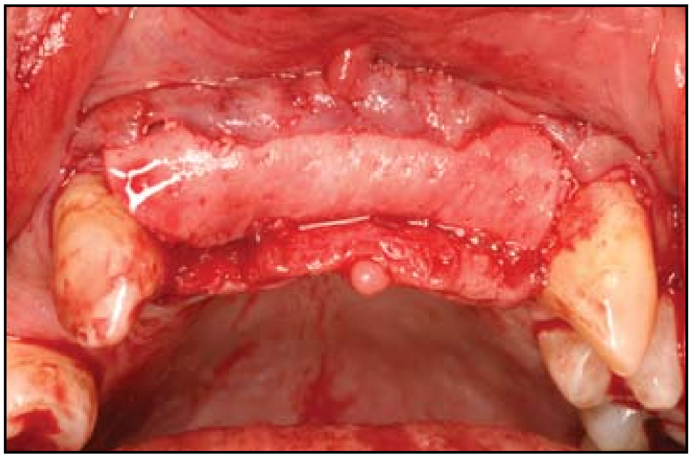

Figure 25: Dermis allograft was placed over the Bio-Oss® graft, serving as a conductive matrix for soft tissue regeneration.

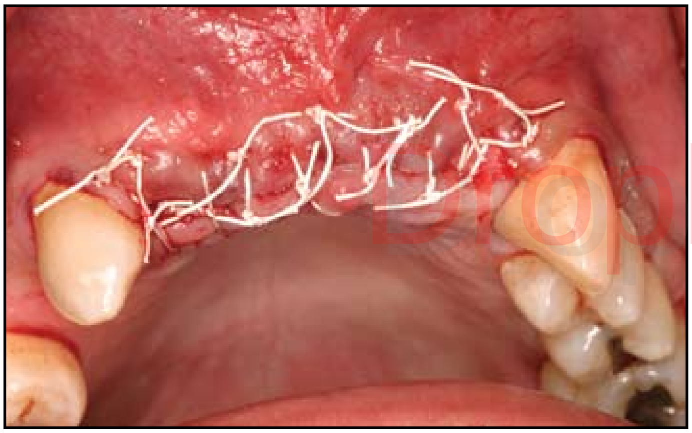

Figure 26: Using 5.0 ePTFE sutures the mucoperiosteal flaps were closed without tension.

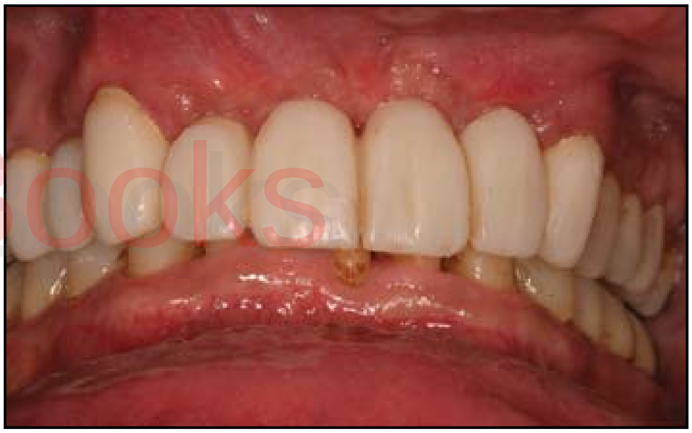

Figure 27: An interim restoration with ovate shaped pontics was temporarily cemented into place.

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in a severe Seibert Class III defect, resulting in a dental Class III occlusal relationship (figures 32, 33). In order to compensate for the trauma induced functional and esthetic deformity, the patient wore a removable appliance with an exaggerated bucco-palatal flange (figures 34, 35).

Figures 1 through 6 describe the step-by-step corrective surgical procedures used in this case, including placement of an interim restoration that served as a guide for the development of interdental papillae. An occlusal view of the fixed interim restoration demonstrates the elimination of the abnormal “emergence profile” seen in the patient’s removable appliance (figure 36). The traumatically induced Class III occlusal relationship has been eliminated through simultaneous bone and soft tissue grafting, allowing proper positioning of the fixed restoration. Overly contoured, ridge lap

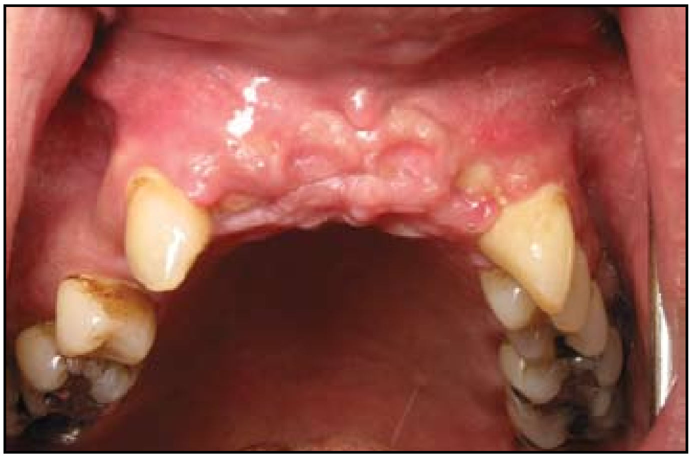

Figure 28: Using the interim restoration as a guide, interdental papillae have been formed in order to allow for excellent esthetics and proper emergence profiles of the definitive fixed restoration.

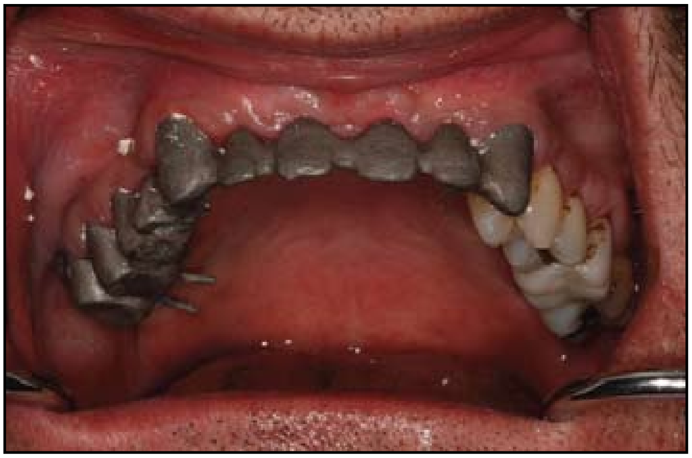

Figure 29: The cast metallic framework for the final maxillary restoration demonstrates the increase in ridge width as well as creation of interdental papillae obtained by correcting the patient's Seibert's Class III defect with simultaneous bone and soft tissue grafting.

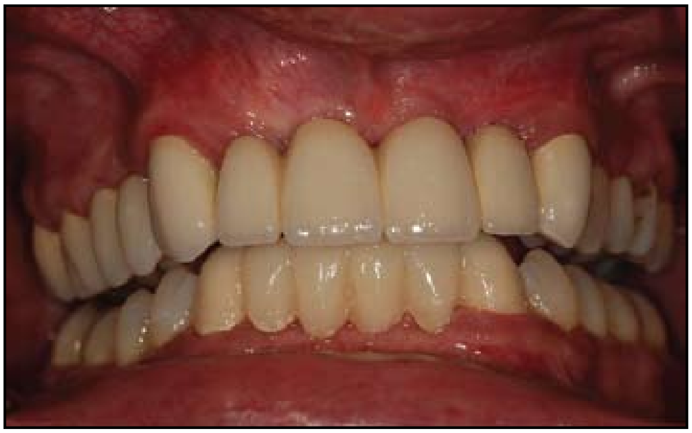

Figure 30: Improvement in both function and esthetics is evident following Bio-Derm ridge plumping and delivery of final restorations.

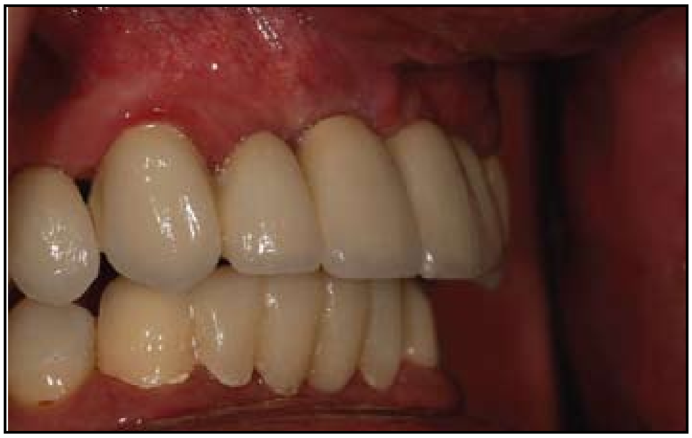

Figure 31: Note improved soft/hard tissue relationship compared to figure 20.

pontics are unnecessary once the patient's normal anatomy was restored. Instead, esthetic and readily cleansable ovate shaped pontics become the replacement restoration of choice (figure 37). The final definitive fixed restoration demonstrates dramatic functional and esthetic improvements once the patient's hard and soft tissue ridge deficiencies were corrected through simultaneous hard and soft tissue grafting (figures 38-40).

DISCUSSION

Proper crestal gingival anatomy, including intact interdental papillae, are absolute prerequisites for natural appearing emergence profiles of

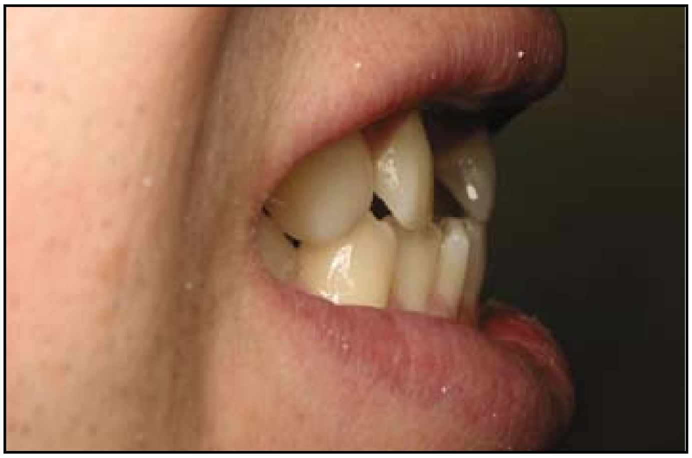

Figure 32: Case 3 pre-op profile.

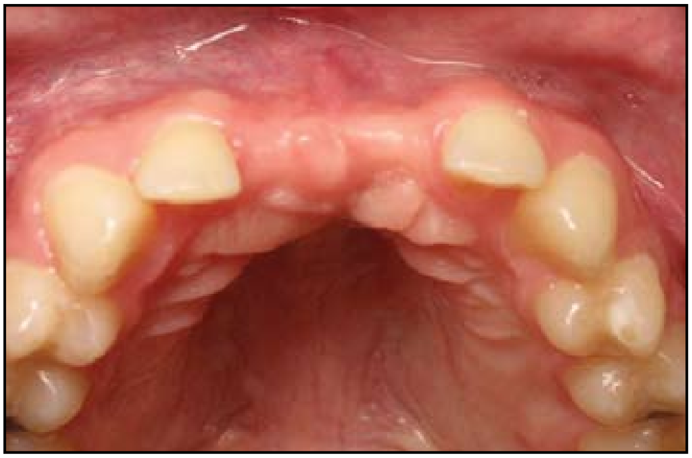

Figure 33: Pre-op Siebert III ridge deficiency of case 3.

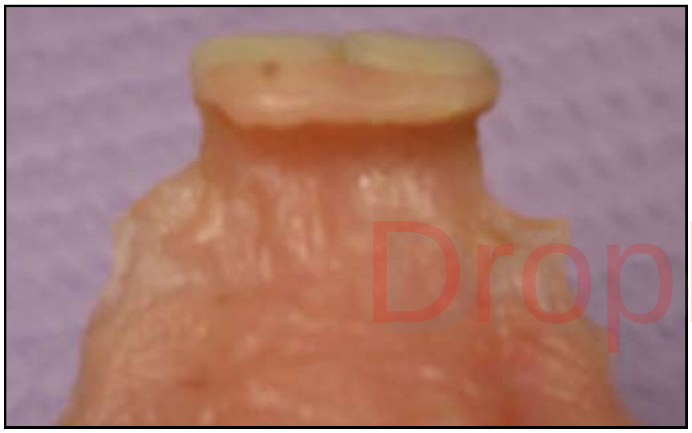

Figure 34: Exaggerated bucco-palatal flange of patient's old removable appliance.

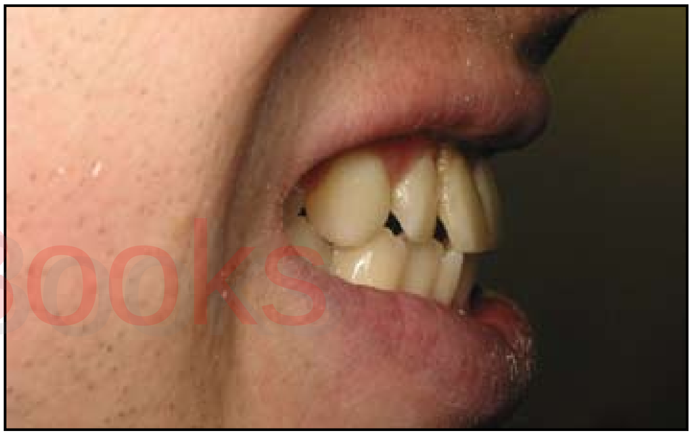

Figure 35: Note exaggerated flaring of incisors with patient's old removable appliance.

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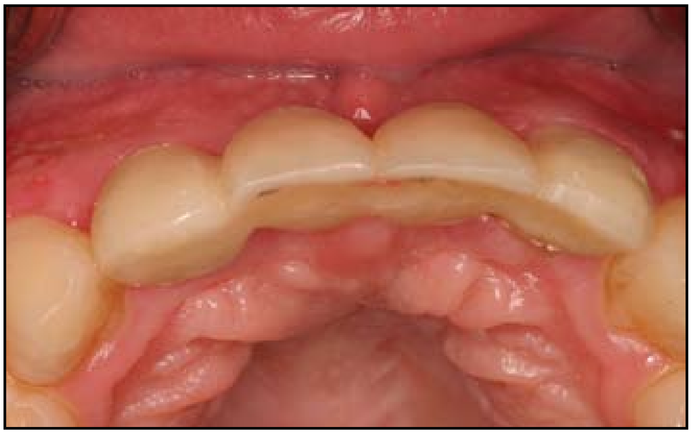


Figure 36: An occlusal view of the fixed interim restoration demonstrates the elimination of the abnormal "emergence profile" seen in the patient's removable appliance.

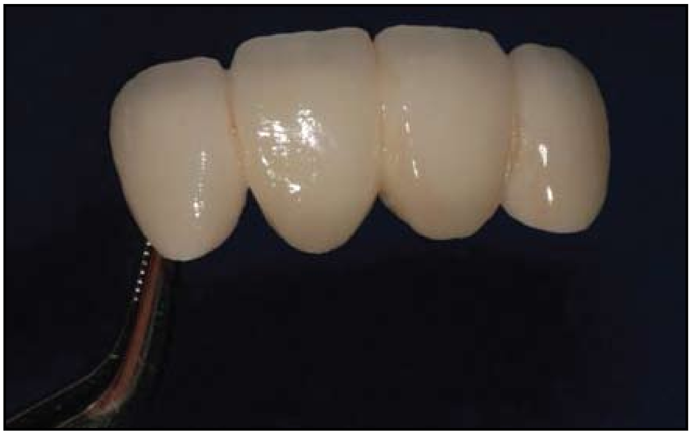


Figure 37: Correcting the patient's anterior ridge deformity allowed fabrication of readily cleansable, esthetic ovate shaped pontics.

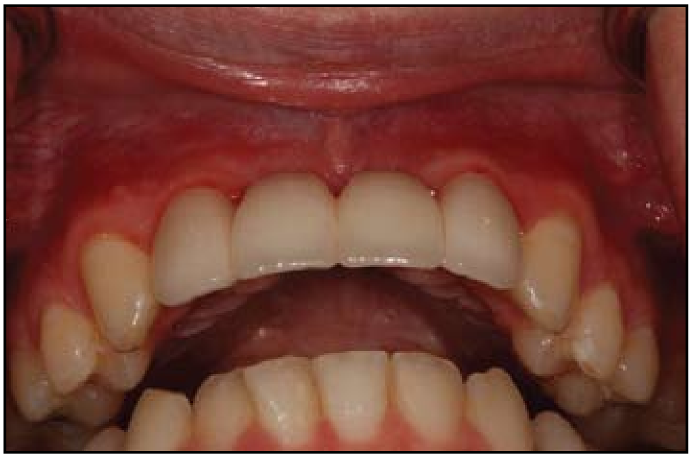


Figure 38: Case 3 final restorations.

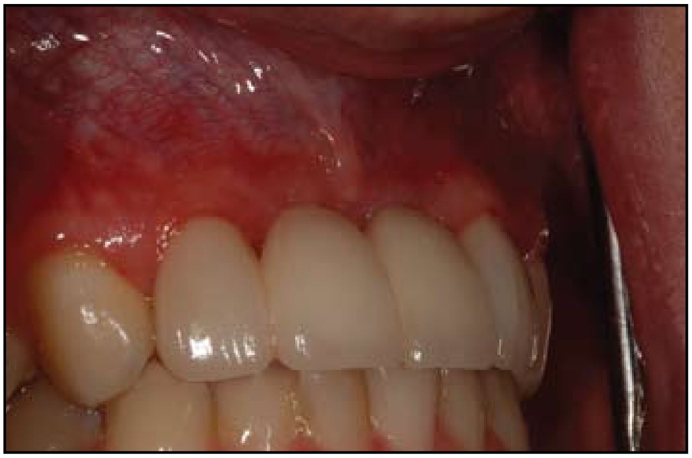
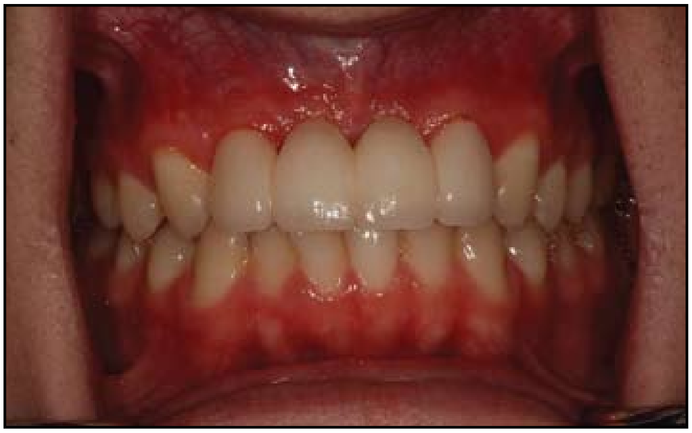


Figure 39: Note improvement of soft/hard tissue relationship after Bio-Derm augmentation.



Figures 38-40: By eliminating the Class III dental malocclusion through correction of the anterior maxillary alveolar defect, dramatic functional and esthetic improvements were possible in the final definitive fixed restoration.

traditional fixed or implant supported restorations in the esthetic zone of the maxilla. Without normal soft tissue morphology, truly esthetic restorations cannot be achieved regardless of additional clinical effort. Adequate soft tissue architecture, however, is dependent upon a foundation of anatomically stable and healthy alveolar bone.[48] In the critical esthetic zone, however, marginal buccal alveolar bundle bone, combined with thin buccal cortical bone, lead to significant bone resorption following tooth removal.[3-4] Gingival recession, distortion, and loss of interdental papillae are the inevitable sequelae of bone loss in the anterior maxilla. Seibert Class I, II, and III defects are therefore commonly encountered in the esthetic zone and must be adequately treated if esthetic fixed restorations are to be achieved.

A variety of clinical approaches have been used to restore normal soft tissue architecture.[22-29] Frequently, when non-implant supported fixed restorations are contemplated, autogenous or allograft soft tissue augmentation procedures are used without regard to the underlying bony morphology. While sometimes effective, multiple soft tissue grafting surgeries are often required before an adequate gingival profile can be achieved.[25] At times the results from soft tissue grafting alone are inadequate to sustain long-term stable results, especially when attempting to reconstruct interdental papillae in the presence of significant underlying apicocoronal and bucco-palatal bone loss.

A more predictable approach to achieving esthetic and stable soft tissue marginal tissues in the anterior maxilla may be to correct both the hard and soft tissue deficiencies present in most ridge defects. In the current 30 patient case series, simultaneous grafting of both the underlying bone and the overlying soft tissue defects without the need of invasive harvesting procedures appeared to result in the natural emergence profiles critical to esthetic fixed restorations.

Critically important to restoring normal 3-dimensional ridge anatomy, especially when faced with significant buccal and crestal bone loss, is to consider the grafting requirements needed for long term stability of the augmented ridge. In order to maintain stable bone volume and architecture in the anterior maxilla, a slowly resorbing graft material with a low substitution rate is needed that can act as a long-term scaffold for continuing bone formation.[49-50] In addition, the graft material should be highly osteoconductive, with a highly porous particle structure and a large inner surface area, both essential prerequisites for effective bone graft substitutes.[51]

The bony ridge defects treated in this case series were difficult to treat Seibert Class III deformities with significant apicocoronal and buccopalatal bone loss. Successful resolution of these defects required effective bone regeneration with sustained, stable 3-dimensional bony architecture over time. Bio-Oss® bone mineral combines a complex, interconnected pore system conducive for effective vascular and osteoblastic cellular ingrowth with slow particle resorption, characteristics ideal for ongoing bone regeneration and long term morphologic ridge stability.[52-54] Bio-Oss® was therefore chosen as the graft material of choice since it is likely to provide the necessary bony support over time required by regenerated gingival soft tissues, including interdental papillae.

Effective bone regeneration, while vitally important to esthetic success of dental restorations within the esthetic zone, must also be associated with adequate overlying soft tissue thickness and architecture in order for true restorative success to be achieved. In each case within this 30 patient case series, apicocoronal and bucco-palatal bone loss was also associated with gingival mucosal atrophy and absence of interdental papillae. Regeneration of normal crestal gingival thickness and restoration of interdental papillae were crucial elements required for successful definitive dental restoration in this critically esthetic area.

As noted earlier, most attempts at soft tissue regeneration rely primarily on autogenous grafts, especially subepithelial connective tissue grafts from the palate.[22-27] Although effective, such grafts require a second invasive surgery and impose a limit to the amount of grafting available at any one time. In addition, the potential for post-operative complications and morbidity are always present.[25] Therefore, in the current series an allogenic acellular dermal matrix was chosen as an alternative to autogenous grafts.

Puros® Dermis allograft served three purposes: 1) To serve as a resorbable barrier membrane, preventing unwanted fibroblastic cellular migration into the Bio-Oss® grafted site during the active Guided Bone Regenerative period; 2) To increase overall gingival thickness; and 3) To provide sufficient soft tissue depth for the formation of interdental papillae. Although generally placed directly onto a periosteal bed as a subsequent procedure following successful bone regeneration, in this particular series the acellular dermal matrix was placed immediately over the Bio-Oss® graft, simultaneously accomplishing both bone grafting and soft tissue augmentation in a single

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surgical visit. Vascular ingrowth from all areas of the surrounding host bed, including the overlying periosteum, appeared adequate for successful bone and soft tissue regeneration to occur.

While hard and soft tissue grafting were critically necessary procedures, proper development of interdental papillae through careful fabrication and continued appropriate revision of the fixed interim restoration cannot be overstated. Meticulous use of properly shaped ovate pontics adjacent to regenerating gingival soft tissues allowed for the development of interdental papillae and natural appearing emergence profiles, elements crucial to final restorative success.

CONCLUSION

Thirty consecutive patients with significant Seibert Class III alveolar ridge defects were successfully treated with simultaneous bone (Bio-Oss® particulate) and soft tissue grafting (Puros® Dermis Allograft) procedures. The authors have coined this procedure the "Bio-Derm Ridge Plumping Technique for Pontic Site Development." By avoiding autogenous hard and soft tissue grafts, the Bio-Derm Ridge Plumping Technique eliminates the need for additional invasive harvesting surgeries while at the same time allowing for the completion of both bone and soft tissue augmentation procedures in a single surgical visit. ●

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Disclosure

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